BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

GB 2292797A

(12) UK Patent Application (19) GB (11) 2 292 797 (13) A

(43) Date of A Publication 06.03.1996

(21) Application No 9417621.1

(22) Date of Filing 02.09.1994

(71) Applicant(s)
Rover Group Limited

(Incorporated in the United Kingdom)

International House, Bickenhill Lane, Bickenhill, BIRMINGHAM, B37 7HQ, United Kingdom

(72) Inventor(s)
David Geoffrey Brown

(74) Agent and/or Address for Service
Robert Michael Farrow
Rover Group Limited, Gaydon Test Centre, Banbury Road, Lighthorne, Warwick, CV35 0BL, United Kingdom

(51) INT CL[6]
B60H 1/34

(52) UK CL (Edition O)
F4V VGBE V101 V109
U1S S1820

(56) Documents Cited
EP 0596446 A1 EP 0479734 A1 EP 0412066 A1
WO 94/00310 A1 US 4741258 A US4610196 A
US 3802328 A

(58) Field of Search
UK CL (Edition M) F4V VGBB VGBE
INT CL[5] B60H 1/24 1/34

(54) An adjustable air vent for a vehicle interior

(57) The air vent comprises a duct 30 having an outlet vent 39 and an adjustable member 32 comprising an air deflector 35, 36 for controlling the direction of air flow through the outlet vent 39 and a closure member 37 for interrupting flow completely. The adjustable member 32 comprises two elongate vanes 35, 36 which are inclined relative to each other and a closure member 37 having a periphery which is of substantially complementary shape to the cross-sectional shape of the duct. The two vanes 35, 36 are spaced apart with the closure member 37 therebetween. The vanes 35, 36 are also inclined relative to each other to provide a funnel-effect on air flowing therebetween. The outlet vent itself is provided with fixed horizontal and transverse vanes (Fig. 9, not shown).

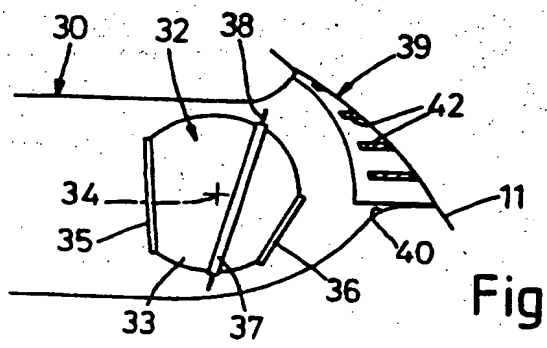

Fig. 4

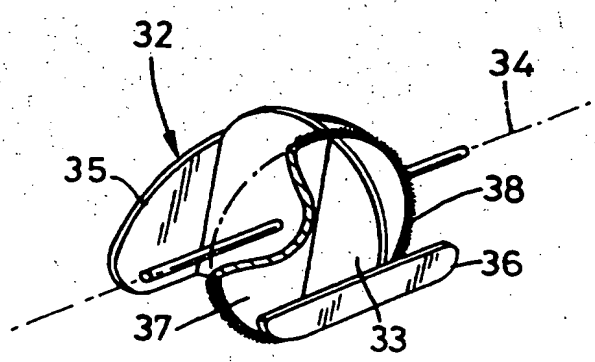

Fig. 8

GB 2 292 797 A

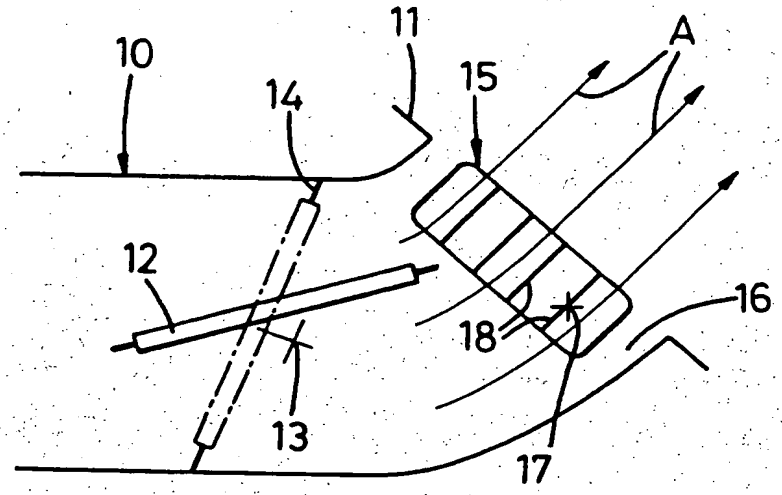

Fig. 1

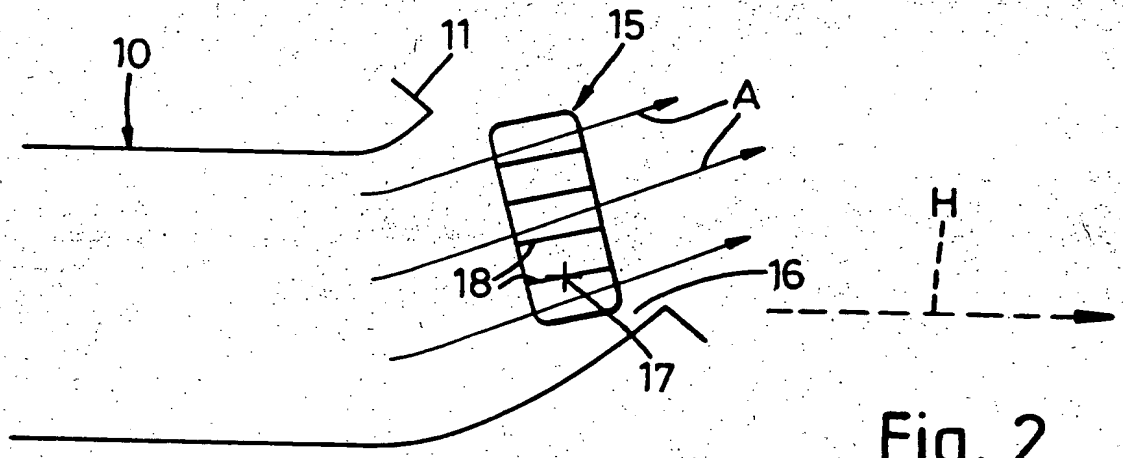

Fig. 2

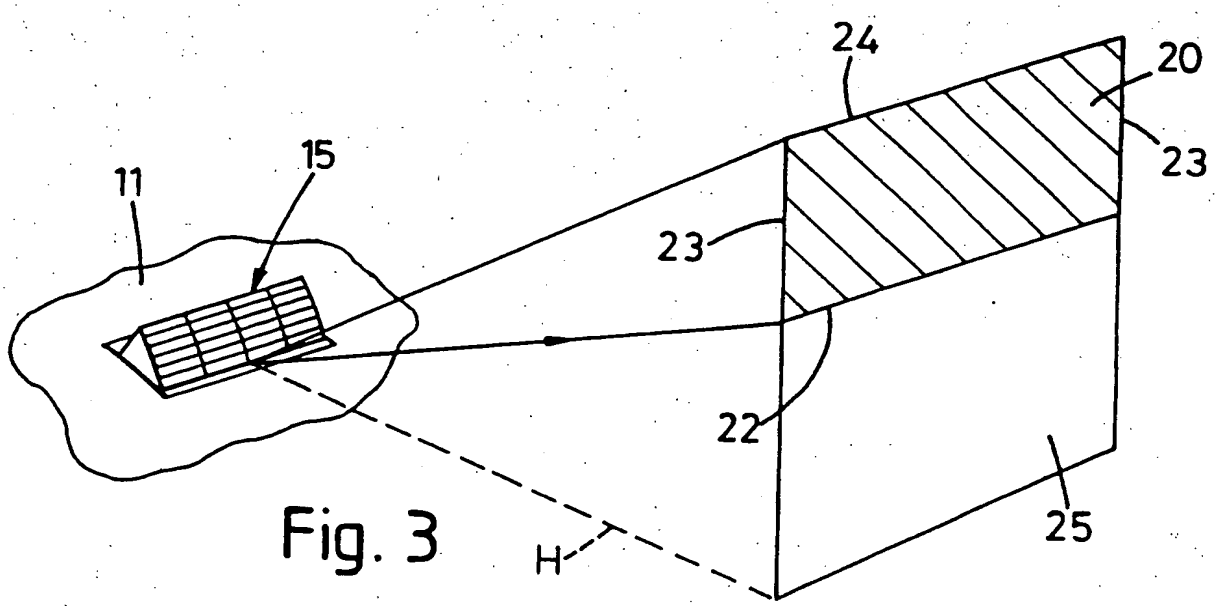

Fig. 3

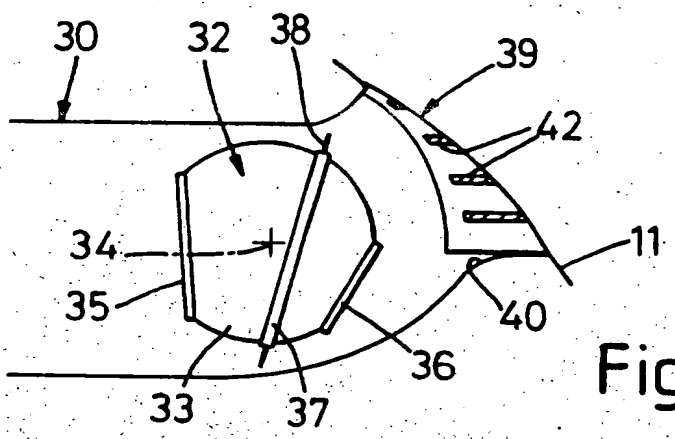

Fig. 4

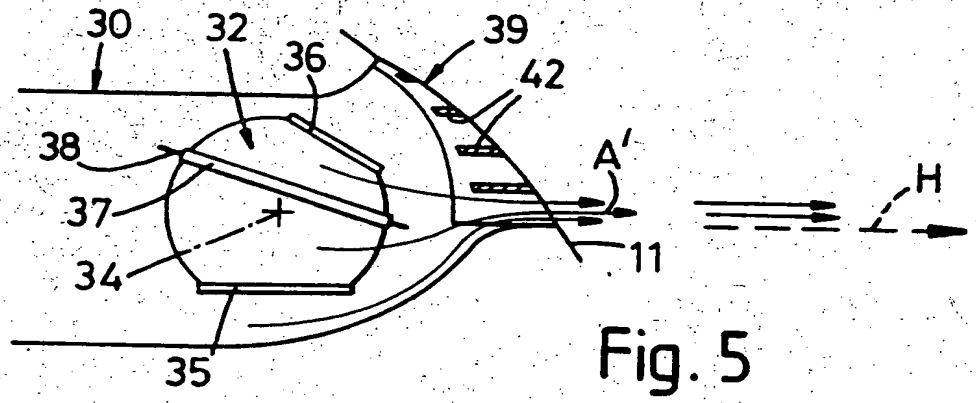

Fig. 5

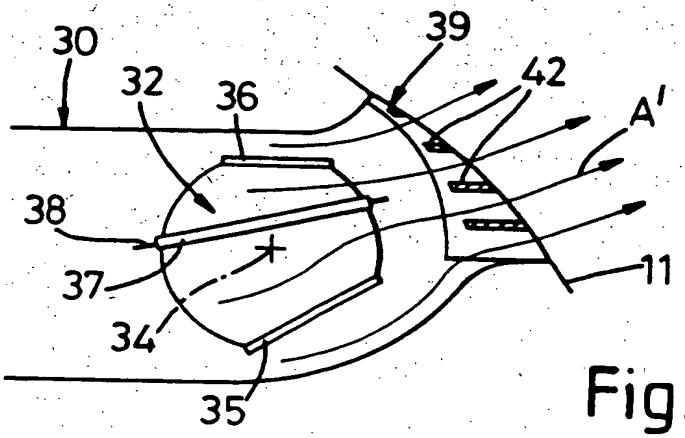

Fig. 6

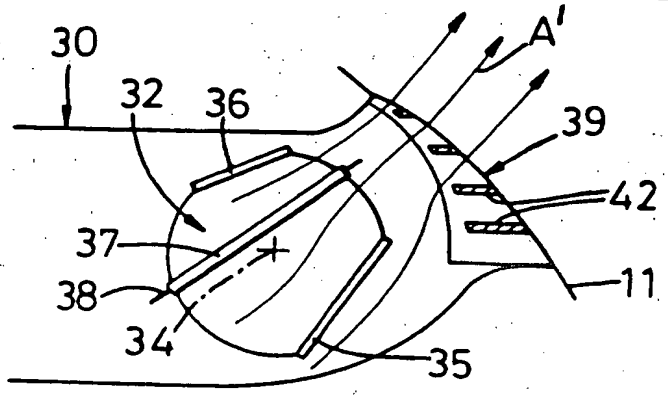

Fig. 7

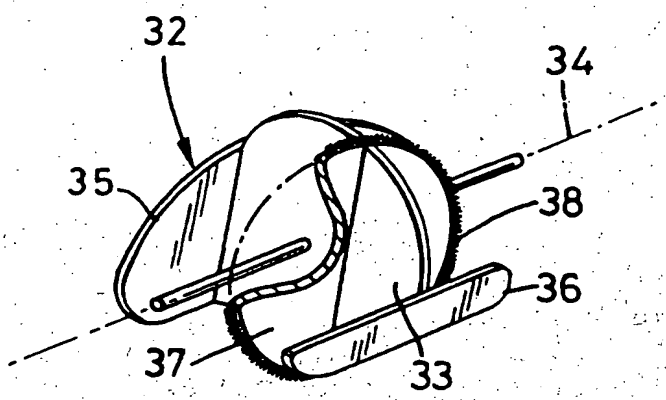

Fig. 8

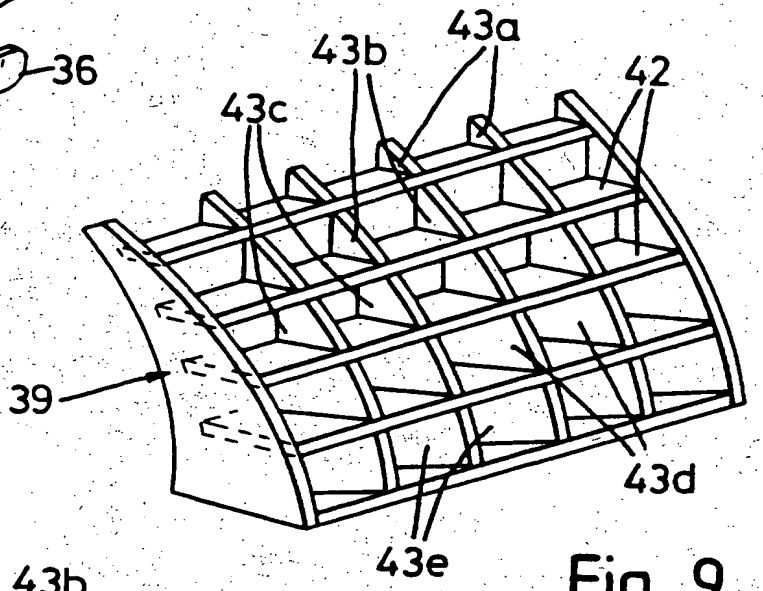

Fig. 9

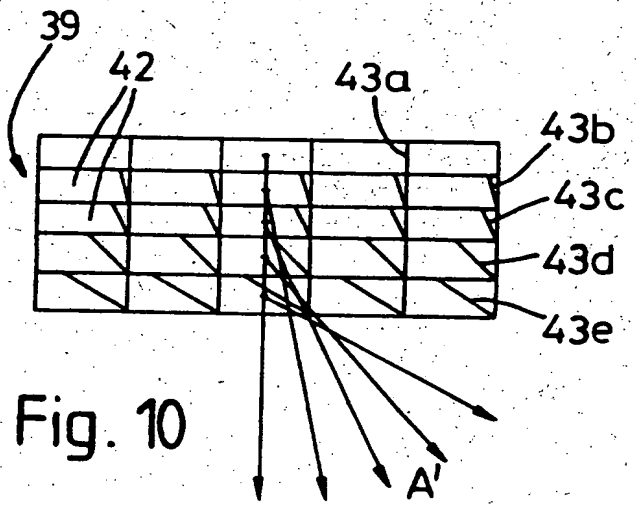

Fig. 10

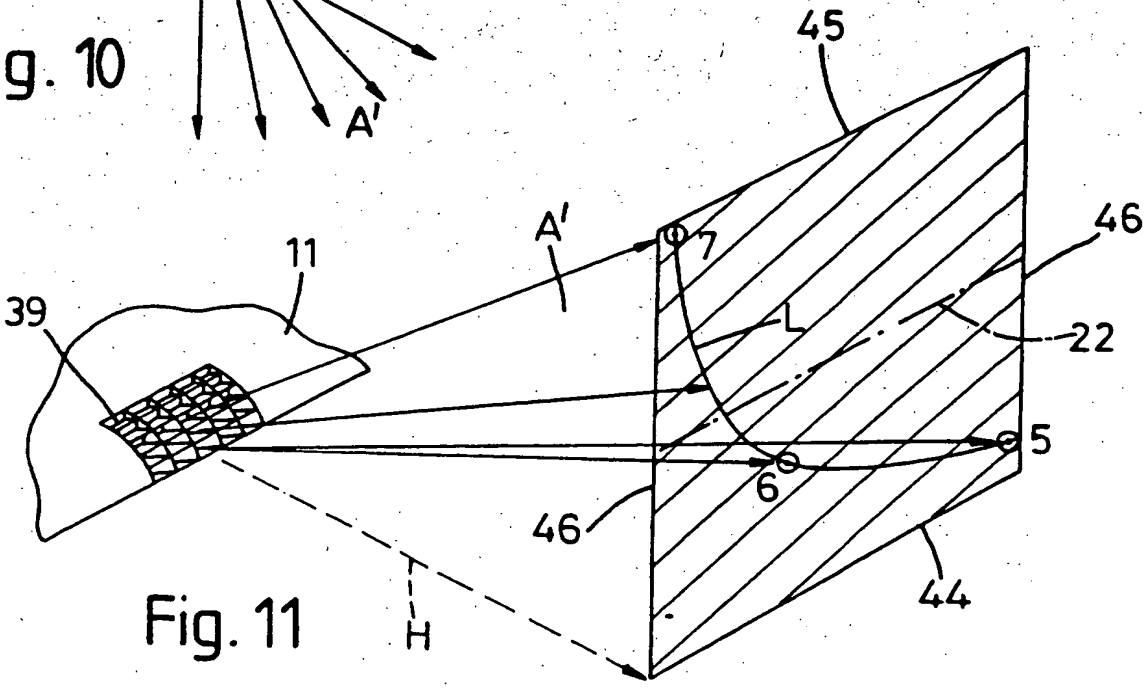

Fig. 11

2292797

AN AIR VENT FOR A VEHICLE INTERIOR

The invention relates to an air vent for a vehicle interior and is particularly, but not exclusively, concerned with an air vent of the kind which is normally found on a vehicle fascia.

Over the years, a considerable amount of development work has been carried out in relation to vehicle interior air vents. Air vents are now fairly complex in construction and utilise numerous components in order to provide adequate air flow and directional control. Typically, an air vent for a vehicle will comprise an outlet vent from an air duct, an adjustable air deflector for controlling the direction of air flow through the outlet vent and an independently adjustable closure member for interrupting the flow of air through the duct. With such an arrangement, separate operating knobs or handles are provided to enable the air deflector and the closure member to be operated independently. In view of the number of movable components required with such an arrangement, air vents for vehicles tend to be expensive items and an object of the present invention is to provide an improved air vent for a vehicle in which the number of movable components is kept to a minimum.

According to the invention there is provided an air vent for a vehicle interior comprising an outlet vent from an air duct and an adjustable member in the duct immediately upstream of the outlet vent, the adjustable member including an air deflector for controlling the direction of air flow through the outlet vent and a closure member for interrupting the flow of air through the duct.

By making the air deflector and the closure member part of the adjustable member, the air vent can be made to operate efficiently without the provision of a separate operating knob or handle for the closure member.

Preferably, the adjustable member is pivotally mounted in the duct.

The air deflector is preferably offset from the axis of pivoting of the adjustable member. Likewise, the closure member may be offset from the axis of pivoting of the adjustable member.

In a preferred embodiment, the air deflector comprises an elongate vane which extends across the duct.

The closure member preferably has a periphery which is substantially of complementary shape to the cross-sectional shape of the duct. In that way, the closure

member can close the duct effectively to prevent further flow of air therethrough when required.

The air deflector and the closure member are preferably spaced apart in a direction transverse to the direction of air flow through the duct.

Preferably, two air deflectors are provided spaced apart in a direction transverse to the direction of air flow through the duct. Both the air deflectors may be in the form of elongate vanes and the vanes may be inclined in relation to each other about their longitudinal axes. In that way, a funnel-like flow path can be defined by the air deflectors which helps to control the direction of air flow through the outlet vent accurately.

Where two air deflectors are provided, the closure member may be arranged between them.

The outlet vent may comprise a plurality of spaced apart outlet vanes which may be parallel and which are preferably horizontal. Further spaced-apart outlet vanes may be provided transverse to the first said spaced-apart outlet vanes. In such a case, the further spaced-apart outlet vanes are preferably orientated so that they allow air to flow through a first region of the outlet vent in a direction substantially parallel with air flow through

the duct but deflect sideways air which flows through a second region of the outlet vent. Preferably the first region of the outlet vent is an upper region and the second region of the outlet vent is a lower region. In the latter case, the further outlet vanes may be orientated to gradually increase the amount of sideways deflection of the air from the first region of the outlet vent to the second region. In order to simplify even further the construction of the air vent, the outlet vanes are preferably immovable.

An air vent for a vehicle interior in accordance with the invention will now be described by way of example with reference to the accompanying drawings in which:

Fig 1 is a diagrammatic cross-section through a vehicle fascia air duct of known kind having a pivotable outlet vent shown in one extreme position of pivotal movement,

Fig 2 is a view similar to Fig 1 showing the outlet vent in its other extreme position of pivotal movement.

Fig 3 is a perspective view of part of a vehicle fascia having the vent arrangement shown in Figs 1 and 2 and illustrating the area of air stream impingement in the vehicle which is available with the air vent.

Fig 4 is a cross-section of a vehicle fascia air vent in accordance with the invention showing an adjustable member having a closure member interrupting flow of air through an air duct, and also having an air deflector in the form of two vanes,

Fig 5 is a view similar to Fig 4 showing the closure member in an open position with the air deflector directing air out of the bottom of an outlet vent.

Fig 6 is a view similar to Figs 4 and 5 showing the air deflector positioned to direct air out of the full depth of the outlet vent,

Fig 7 is a view similar to Figs 4 to 6 showing the air deflector positioned so as to direct air out of the top of the outlet vent,

Fig 8 is a perspective broken away view of the adjustable member shown in Figs 4 to 7 including the closure member and air deflector vanes,

Fig 9 is a perspective view of the outlet vent of Figs 4 to 7,

Fig 10 is a diagrammatic plan view of the outlet vent of Fig 9 showing variation in air flow direction between

upper and lower regions thereof and

Fig 11 is a view similar to Fig 3 showing the available area of air jet impingement.

Looking at the conventional form of air vent as shown in Figs 1 to 3, a duct 10 has a closure member 12 mounted therein. The closure member 12 is pivotable about an axis 13 and has a soft seal 14 around its periphery. The peripheral shape of the closure member 12 is substantially complementary to the internal cross-sectional shape of the duct 10. An outlet vent 15 is positioned within an outlet orifice 16 of the duct 10 and is mounted on a suitable pivot for movement about an axis 17. In Fig 1, the outlet vent 15 is shown pivoted fully anti-clockwise and in Fig 2 the outlet vent 15 is shown pivoted fully clockwise. The duct 10 terminates at a fascia 11.

The outlet vent 15 comprises a series of parallel vanes 18. Immediately behind the vanes 18 (but not shown in Figs 1 and 2) are several elongate vertical vanes which can be adjusted about their vertical axes to vary the way in which air leaves the outlet vent 15 in a side to side direction.

In Fig 1, the closure member 12 is shown in its open

position in full lines and in its closed position in broken lines. In the full line position, air passes through the duct 10 and through the outlet vent 15 as an air stream indicated by arrows A. To lower the air stream, the outlet vent 15 is pivoted clockwise towards the position shown in Fig 2. However, it will be noted that the air stream A is still generally upward and with the arrangement shown in Figs 1 and 2, it is not possible to lower the air stream A to the horizontal as indicated by the broken line H.

Looking at Fig 3, the area of air stream impingement is indicated by a hatched area 20, the lowest level of air stream deflection being indicated at 22 and the side to side boundaries of air stream deflection being indicated at 23. The highest level of air stream deflection is indicated at 24. It will be noted that there is a large unhatched area indicated at 25 which is not covered by the air vent as the air vent is unable to direct the air stream beyond level 22 to the horizontal level H. Moreover the vent of Figs 1 to 3 requires pivotal mountings for both the outlet vent 15 and the closure member 12.

With the present invention as shown in Figs 4 to 11, it is possible to increase the lower level of air stream deflection and reference is now made to those Figures.

In accordance with the present invention, a duct 30 houses an adjustable member 32. The adjustable member 32 comprises a plate 33 arranged centrally of the duct 30 and which is mounted for pivoting on the duct about an axis 34. A knob or handle (not shown) is provided on a fascia 11 for pivoting the adjustable member 32. The plate 33 carries air deflectors in the form of two vanes 35, 36 offset from the axis 34. The plate 33 also carries a closure member 37 between the vanes 35, 36 and which is also offset from the axis 34. The vanes 35, 36 extend each side of the plate 32. The closure member 37 has a soft seal 38 around its periphery, the periphery being of substantially complementary shape to the internal cross-sectional shape of the duct 30.

The vanes 35, 36 are inclined relative to each other and are of different widths.

An outlet vent 39 is arranged in an outlet orifice 40 of the duct 30. The outlet vent 39 has a series of parallel horizontal vanes 42 and a series of vertical vanes 43a - 43e. The vanes 43a are generally parallel with the direction of air flow through the duct 30. The vanes 43b - 43e are deflected increasingly as shown in Figs 9 and 10 so as to deflect air passing through the lower region of the outlet vent 39 more to the right as viewed in Fig 10 than air passing through the upper region of the

outlet vent. Unlike the outlet vent 15 in Figs 1 and 2, the outlet vent 39 is not pivotally mounted and the vanes 42 and 43a -43e are fixed.

The use of the air vent shown in Figs 4 to 11 will now be described.

With the closure member 37 in the position shown in Fig 4a, the soft seal 38 inhibits flow of air through the duct 30 to the outlet vent 39.

With the adjustable member 32 rotated to the Fig 5 position, the vanes 35, 36 act as a funnel so that an air stream A' is directed through the lower part of the outlet vent 39 as viewed in Fig 5, the vane 35 being inclined upwardly and the vane 36 and closure member 37 being inclined downwardly in relation to the air flow through the duct 30. It will be noted from Fig 5 that the upper edge of the vane 36 lies close to the surface of the duct 30 whereby to restrict movement of air towards the upper region of the outlet vent 39. However, the lower edge of the vane 35 is spaced from the adjacent surface of the duct 30 so as to permit air to flow beneath the vane to the lower region of the outlet vent 39.

If the adjustable member 32 is moved anti-clockwise about

the axis 34 to the Fig 6 position, air can flow under the lower surface of the vane 35 and over the upper surface of the vane 36 as well as between the two vanes so that the air stream A' will flow through substantially the whole of the outlet vent 39.

If the adjustable member 32 is pivoted anti-clockwise to the Fig 7 position, the funnel-effect and positioning of the vanes 35, 36 causes the air stream A' to pass through the upper region of the outlet vent 39.

Looking at Fig 11, the maximum lower and upper levels of the air stream A available with the air vent in accordance with the invention are indicated at 44 and 45 respectively and the boundaries of sideways deflection of the air stream A are indicated at 46. The lowest level of air stream deflection of the air vent of Figs 1 and 2 is indicated by broken line 22 in Fig 8. Therefore, it can be seen that an air vent in accordance with the present invention provides a much greater available area of air stream impingement extending down to the horizontal level H. A locus of the centre of the air stream A is indicated in Fig 11 by a curve L, points 5, 6 and 7 corresponding to the air flows shown in Figs 5, 6 and 7 respectively. The locus L is dependent on the gradually sideways deflection imparted to the air stream A' by the deflected vanes 43b - 43e and which is apparent

from Fig 10.

With the conventional air vent shown in Figs 1 and 2, both the closure member 12 and the outlet vent 15 require pivotal mountings thereby complicating the construction of the air vent. However, with an air vent in accordance with the invention as shown in Figs 4 to 11, it is necessary to provide a pivotal mounting and an external operating knob or handle only for the adjustable member 32 and the construction of the air vent is thereby simplified.

It is envisaged that one of the vanes 35, 36 could be omitted. With such an arrangement, the directional control of the air flow would not be as positive but would still provide a greater of area of air stream impingement than would be obtained with the conventicnal air vent shown in Figs 1 and 2.

CLAIMS

1 An air vent for a vehicle interior comprising an outlet vent from an air duct and an adjustable member in the duct immediately upstream of the outlet vent, the adjustable member including an air deflector for controlling the direction of air flow through the outlet vent and a closure member for interrupting the flow of air through the duct.

2 An air vent according to Claim 1 in which the adjustable member is pivotally mounted in the duct.

3 An air vent according to Claim 1 or 2 in which the air deflector is offset from the axis of pivoting of the adjustable member.

4 An air vent according to Claim 1, 2 or 3 in which the air deflector comprises an elongate vane which extends across the duct.

5 An air vent according to any preceding Claim in which the closure member is offset from the axis of pivoting of the adjustable member.

6 An air vent according to any preceding Claim in which the closure member has a periphery which is substantially of complementary shape to the cross-

sectional shape of the duct.

7 An air vent according to any preceding Claim in which the air deflector and the closure member are spaced apart.

8 An air vent according to any preceding Claim in which two spaced apart air deflectors are provided.

9 An air vent according to Claim 8 in which both air deflectors are in the form of elongate vanes.

10 An air vent according to Claim 9 in which the vanes are inclined in relation to each other about their longitudinal axes.

11 An air vent according to Claim 9 or 10 in which the closure member is arranged between the air deflectors.

12 An air vent according to any preceding Claim in which the outlet vent comprises a plurality of spaced-apart outlet vanes.

13 An air vent according to Claim 12 in which the outlet vanes are parallel.

14 An air vent according to Claim 12 or 13 in which the

outlet vanes are horizontal.

15 An air vent according to Claim 12 in which further spaced-apart outlet vanes are provided transverse to the first said spaced-apart outlet vanes.

16 An air vent according to Claim 15 in which the further spaced-apart outlet vanes are orientated so that they allow air to flow through a first region of the outlet vent in a direction substantially parallel with air flow through the duct but deflect sideways air which flows through a second region of the outlet vent.

17 An air vent according to Claim 16 in which the first region of the outlet vent is an upper region and the second region is a lower region.

18 An air vent according to Claim 17 in which the further outlet vanes are orientated to gradually increase the amount of sideways deflection of the air from the first region of the outlet vent to the second region.

19 An air vent according to any of Claims 12 to 18 in which the outlet vanes are immovable.

20 An air vent for a vehicle interior constructed and arranged substantially as described herein with reference

to the accompanying drawings.

Patents Act 1977
Examiner's report to the Comptroller under Section 17
(Search report)

Application number
GB 9417621.1

Relevant Technical Fields

(i) UK Cl (Ed.M) F4V (VGBE, VGBB)

(ii) Int Cl (Ed.5) B60H 1/34, 1/24

Search Examiner
BRIDIE COLLIER

Date of completion of Search
20 DECEMBER 1994

Databases (see below)
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii)

Documents considered relevant following a search in respect of Claims :-
1 TO 20

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	EP 0596446 A1	(FOGGINI) see Figure 5 and adjustable member 250	1 to 6, 12 to 14, 19
X	EP 0479734 A1	(FIAT) see adjustable member 14	1 to 3, 5, 12 to 14, 19
X	EP 0412066 A1	(FIAT) see adjustable member 14	1 to 3, 5
X	WO 94/00310 A1	(SCHNEIDER) see adjustable member with flap 31 and blades 4	1 to 9
X	US 4741258 A	(DAIMLER) see adjustable member 23	1, 2, 4, 6, 12, 13, 19
X	US 4610196 A	(KERN) see Figure 4 and adjustable member 26	1 to 9
X	US 3802328 A	(NISSAN) whole document	1 to 3, 5 to 8

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).